

# PATENT ABSTRACTS OF JAPAN

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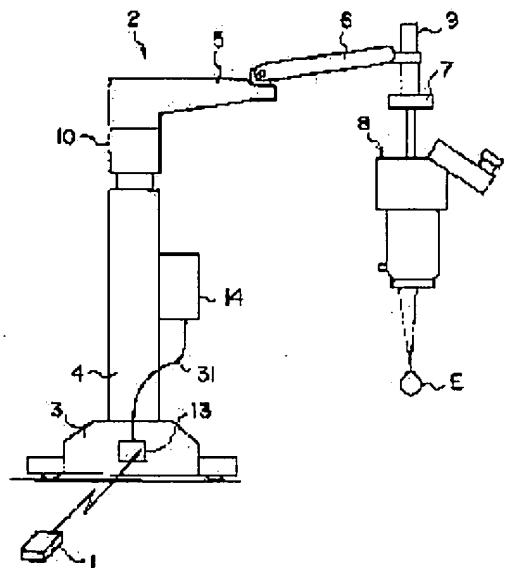
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## (54) MICROSCOPE FOR OPERATION

### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a microscope for an operation whose operability is improved and which has an operation switch wholly unhindering even in a sanitary aspect.

SOLUTION: A switch 1 to operate various functions of the main body of a microscopy by an operation signal by foot-stepping operation to the main body of the microscope 2 for an operation, can transmit the operation signal to the main body by wireless. Therefore, a connecting cable can be obviated, and that the connecting cable hitches on feet or the like is wholly eliminated.



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## CLAIMS

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### [Claim(s)]

[Claim 1] The operation microscope characterized by said actuation switch making an actuation signal ready-for-sending ability by wireless to said body in the operation microscope which has the actuation switch which sends an actuation signal to the body of an operation microscope, and operates the various functions of this body.

[Claim 2] Said actuation switch is the operation microscope according to claim 1 carry out becoming from the actuation switch for way persons which transmits the object for focal adjustment of the body of an operation microscope, the object for zoom adjustment, the object for X-Y migration, and each actuation signal for vertical jogging, and the actuation switch for assistants which transmits the object for a power-source drive and each actuation signal for vertical jogging by step actuation to said body as the description.

[Claim 3] Said body is the operation microscope according to claim 2 which equipped the location of the surrounding arbitration of this body with the movable receive section, and made the actuation signal ready-for-sending ability respectively in said receive section with the actuation switch for way persons of the location of arbitration, and the actuation switch for assistants.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[The technique in which invention belongs] This invention relates to the operation microscope which has an actuation switch.

[0002]

[Description of the Prior Art] The foot switch 51 as an actuation switch of the conventional operation microscope 50 used for an ophthalmology operation etc. is connected to the control box 53 attached in the stanchion 52 of an operation microscope 50 using a little thick and flexible an interconnection cable 54 and a connector 55, as shown in drawing 9. And various kinds of actuation signals are sent to the control box 53 of an operation microscope 50, and the various functions of this operation microscope 50 are operated because a way person or an assistant does step actuation of the foot switch 51.

[0003] The pedestal 65 to which said operation microscope 50 supports a stanchion 52 possible [ transit ] to a floor line, The 1st arm 61 supported with the stanchion 52, and the 2nd arm 62 attached in the protrusion edge of this 1st arm 61, The body 64 of a microscope possessing the zoom system driven in X and the direction of Y by the X-Y mechanical component 63 attached in the protrusion edge of the 2nd arm 62 and this X-Y mechanical component 63, a focal system, an illumination system, etc. is provided, and optometry E-ed is observed with the body 64 of a microscope.

[0004]

[Problem(s) to be Solved by the Invention] However, it sets to the foot switch 51 of the conventional operation microscope 50 mentioned above. Since it is what is connected to the control box 53 using the interconnection cable 54 or the connector 55, When observing optometry E-ed with this operation microscope 50 and performing the ophthalmology operation The interconnection cable 54 was caught in the way person, an assistant's guide peg, or the equipment for an operation, was interfered with it, and there was a problem that the operability of an operation microscope 50 falls, or the blood of the from examined [ which is produced by ophthalmology operation / E ] the eyes adhered to an interconnection cable 54, and a health side got worse.

[0005] Then, this invention wireless-izes the actuation signal sent to an operation microscope from an actuation switch, and it aims at offering the operation microscope which has the actuation switch which is convenient in any way also in respect of health while it can aim at improvement in operability.

[0006]

[Means for Solving the Problem] Invention according to claim 1 is characterized by said actuation switch making an actuation signal ready-for-sending ability by wireless to said body in the operation microscope which has the actuation switch which sends an actuation signal to the body of an operation microscope, and operates the various functions of this body. Thus, an actuation signal can be transmitted to a body by wireless.

[0007] Invention according to claim 2 carries out becoming from the actuation switch for way persons which transmits the object for focal adjustment of the body of an operation microscope, the object for zoom adjustment, the object for X-Y migration, and each actuation signal for vertical jogging, and the actuation switch for assistants which transmits the object for a power-source drive and each actuation signal for vertical jogging by step actuation to said body as the description in said actuation switch. Thus, the way person and the assistant enable it to transmit an actuation signal according to an individual.

[0008] Said body equips the location of the surrounding arbitration of this body with a movable receive section, and invention according to claim 3 makes an actuation signal ready-for-sending ability respectively in said receive section with the actuation switch for way persons of the location of arbitration, and the actuation switch for assistants. If it does in this way, the actuation signal by the actuation switch can be transmitted even from where.

[0009]

[Embodiment of the Invention] The example of this invention is explained below.

[0010] Drawing 1 shows the operation microscope 2 operated by wireless by the foot switch 1 and this foot switch 1 of a step actuation type of the shape of a rectangular parallelepiped which is the actuation switch used for this example. The pedestal 3 to which this operation microscope 2 supports a stanchion 4 possible [ transit ] to a floor line, The 1st arm 5 supported with the stanchion 4, and the 2nd arm 6 attached in the protrusion edge of this 1st arm 5, The X-Y mechanical component 7 attached in the protrusion edge of the 2nd arm 6, and the body 8 of a microscope which contained the zoom system 11 later mentioned while driving in X and the direction of Y by this X-Y mechanical component 7, the focal system 12, the illumination system, etc., The vertical jogging mechanical component 9 which it is attached [ mechanical component ] in the upper part of the protrusion edge of said 2nd arm 6, and makes the body 8 of a microscope move slightly in the vertical direction (Z direction), The vertical coarse adjustment mechanical component 10 to which it is included in the upper part of said stanchion 4, and the coarse adjustment of the body 8 of a microscope is made to carry out in the vertical direction (Z direction) through the 1st arm 5 and the 2nd arm 6, The receive section 13 which attached in the wall surface of said pedestal 3, and the detail possess the control box 14 which contained the control system of the operation microscope 2 mentioned later.

[0011] Next, the configuration of said foot switch 1 is explained in full detail with reference to drawing 2 .

[0012] This foot switch 1 is considered as the configuration which transmits various kinds of actuation signals over an operation microscope 2 by wireless according to the signal aspect of an electric wave, as shown in drawing 2 .

[0013] Namely, the actuation switch section 21 of the step type which formed this foot switch 1 in that top face, The remote control encoder IC 22 which controls a signal transmission The slide switch 23 which sets up the address of this remote control encoder IC 22 with an ID code, The RF oscillator circuit 24 which applies to which and sends out a pulse burst modulation to the actuation signal used as the serial signal which is inputted from the actuation switch section 21 and sent out from the remote control encoder IC 22, The pattern antenna 25 which changes the actuation signal from this RF oscillator circuit 24 into an electric wave, and is transmitted towards said receive section 13 is provided.

[0014] Drawing 3 is what shows the configuration in the control box 14 of said operation microscope 2. In this control box 14 The RF amplifying circuit 32 which carries out RF magnification of the actuation signal which connected through said receive section 13 and interconnection cable 31, and was received by the receive section 13, The playback demodulator circuit 33 which restores to the actuation signal amplified by the RF amplifying circuit 32, The active filter 34 which amplifies the output signal of the playback demodulator circuit 33 to a logic level, The waveform shaping circuit 35 which shapes the output signal of an active filter 34 in waveform and removes distortion, The decoder IC 36 which controls the functional drive circuit 38 according to the class of actuation signal sent as a serial signal The ID code setting slide switch 37 which sets up the address of a decoder IC 36 with the same ID code as a transmitting side, The ID code which possesses the delay integrating circuit 39 which removes error components, such as a noise, and is set up with the slide switch 23 of said foot switch 1, With the ID code setting slide switch 37 The zoom system 11 connected to the radical of the conditions whose ID codes to set up correspond in said functional drive circuit 38 according to the class of actuation signal, the focal system 12, the X-Y mechanical component 7, the vertical jogging mechanical component 9, the vertical coarse adjustment mechanical component 10, and the power-source mechanical component 26 that drives a power source 27 It drives respectively.

[0015] In addition, although the foot switch 1 mentioned above sent out the actuation signal by wireless with the gestalt of an electric wave, it is easily [ natural ] possible also for constituting so that wireless may send out an actuation signal by the signal aspect of the other infrared radiation of an electric wave, or light, and can attain diversification of the signal aspect at the time of creating a foot switch 1 by doing in this way. For example, what is necessary is to have used, to be [ direction ] desirable and just to choose an electric wave suitably in use, when it is more desirable to use infrared light and light when other equipments may be made to cause malfunction by the electric wave, infrared light and light are used conversely and an optical path is interrupted in many cases.

[0016] According to the operation microscope 2 using the foot switch 1 of the above-mentioned configuration, by carrying out step actuation of said foot switch 1 The actuation signal which operates various functions to the receive section 13 of an operation microscope 2 is transmitted by wireless with the gestalt of an electric wave. By this By actuation of said receive section 13, the high frequency amplifying circuit 32 in the control box 14, the playback demodulator circuit 33, the AKUIIBU filter 34, a waveform shaping circuit 35, a decoder IC 36, and the functional drive circuit 38 The zoom system 11, the focal system 12, the X-Y mechanical component 7, the vertical jogging mechanical component 9, the vertical coarse adjustment mechanical component 10, and the power-source mechanical component 26 that drives a power source 27 operate respectively, and each function of an operation microscope 2 is demonstrated convenient, respectively.

[0017] Consequently, while an interconnection cable becomes unnecessary like the conventional example, and the situation where a guide peg etc. is caught in an interconnection cable becomes that there is nothing and being able to aim at improvement in operability, it becomes that there is also no fear of blood adhering to an interconnection cable like the conventional example, and trouble does not arise at all in respect of health.

[0018] As the actuation switch section 21 of said foot switch 1, two kinds of configurations shown in drawing 4 and drawing 5 can be mentioned, for example. That is, foot switch 1B for assistants for which, as for drawing 5, an assistant uses foot switch 1A for way persons for which a way person uses drawing 4 is shown, the step-type zoom switch 41, the focal switch 42, the X-Y switch 43, and the vertical jogging switch 44 are formed in the top face of foot switch 1A for way persons, and the vertical coarse adjustment switch 45 and the power-source actuation switch 46 are formed in foot switch 1B for assistants.

[0019] thus, by changing a function by foot switch 1A for way persons, and foot switch 1B for assistants, the actuation condition over the operation microscope 2 of a way person and an assistant can be classified clearly, an operation microscope 2 can be operated according to a way person and each assistant's role, and an ophthalmology operation etc. can be carried out efficiently.

[0020] Drawing 6 shows the condition of sending each actuation signal to said receive section 13 by wireless by said foot switch 1 for way persons A, and foot switch 1B for assistants. In this case, if two or more receive sections 13 of the same function are stationed on the wall surface of a pedestal 3, the degree of freedom of arrangement of said foot switch 1 for way persons A and foot switch 1B for assistants can be raised more.

[0021] Moreover, as shown in drawing 7, it sets in the configuration of foot switch 1A for way persons. While operating each piece of a switch of said slide switch 26 and changing the zoom switch 41 in foot switch 1A for way persons, and the focal switch 42 into the function of the vertical coarse adjustment switch 45 for assistants, and the power-source actuation switch 46. If the function of the X-Y switch 43 and the vertical jogging switch 44 can also be killed and is carried out in this way, foot switch 1A for way persons can also be used as foot switch 1 for assistants B.

[0022] Drawing 8 shows the other examples of arrangement of said receive section 13, around the lower part of said stanchion 4, fits in loosely and attaches the band-like rotation object 47 in this rotation object 47 for said interconnection cable 31, enabling free expansion and contraction. A receive section 13 is attached in the edge of an interconnection cable 31, the floor line top is freely made movable for this receive section 13, and an actuation signal is sent to this receive section 13 by wireless from said foot switch 1A for way persons, or foot switch 1 for assistants B.

[0023] The degree of freedom of arrangement of such a configuration, then foot switch 1 for way persons A, and foot switch 1B for assistants increases, it becomes possible to change arrangement of foot switch 1 for way persons A, and foot switch 1B for assistants into arbitration according to the situation of an operation, and an ophthalmology operation etc. can be carried out efficiently.

[0024] In addition, in the above example, although the step-type foot switch 1 was explained as an actuation switch, the same function can be respectively demonstrated with the case where it mentions above even if it constituted the stock remote controller (hand switch) of the same configuration respectively with a foot switch 1, foot switch 1 for way persons A, and foot switch 1B for assistants. especially, when an assistant is a nurse, since having not sterilized usually comes out and a hand has it, a hand switch is effective [ a hand ]. Since a location can be moved if a hand switch is used, there is an advantage that an assistant can operate it in the location which interrupts neither an electric wave nor infrared light. In this case, it is convenient when the receive section is established in the 4th page of a stanchion 4.

[0025] moreover, the bed which accompanies the shutter of a photography camera, and other operations by the actuation signal transmitted by wireless and the object for an operation -- if it constitutes so that a chair etc. may be operated, the function of an actuation switch can be raised further.

[0026]

[Effect of the Invention] According to invention according to claim 1, since an interconnection cable is not used like the conventional example, while that an interconnection cable is caught in a guide peg etc. becomes that there is nothing and being able to aim at improvement in operability, the operation microscope which has the actuation switch which trouble does not produce at all in respect of health can be offered.

[0027] According to invention according to claim 2, the actuation condition over the operation microscope of a way person and an assistant can be classified clearly, and the operation microscope equipped with the actuation switch which can carry out an ophthalmology operation etc. efficiently can be offered.

[0028] According to invention according to claim 3, the degree of freedom of arrangement of the actuation switch for way persons and the actuation switch for assistants increases, and the operation microscope which it has in the actuation switch which becomes possible [ changing arrangement of the actuation switch for way persons and the actuation switch for assistants according to the situation of an operation ], and can carry out an ophthalmology operation etc. efficiently can be provided.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram showing the operation microscope which has the actuation switch of this example.

[Drawing 2] It is the block diagram showing the configuration of the actuation switch used for this example.

[Drawing 3] It is the block diagram showing the control system of the operation microscope of this example.

[Drawing 4] It is the block diagram showing the actuation switch for way persons used for this example.

[Drawing 5] It is the block diagram showing the actuation switch for assistants used for this example.

[Drawing 6] It is the perspective view showing the example of use of the actuation switch for way persons used for this example, and the actuation switch for assistants.

[Drawing 7] It is the explanatory view showing the case where the actuation switch for way persons used for this example is changed into the actuation switch for assistants.

[Drawing 8] It is the outline perspective view showing the modification of a receive section in the operation microscope of this example.

[Drawing 9] It is the outline block diagram showing a conventional operation microscope and a conventional actuation switch.

[Description of Notations]

1 Foot Switch (Actuation Switch)

1A The foot switch for way persons

1B The foot switch for assistants

2 Operation Microscope

3 Pedestal

4 Stanchion

7 X-Y Mechanical Component

8 Body of Microscope

9 Vertical Jogging Mechanical Component

10 Vertical Coarse Adjustment Mechanical Component

11 Zoom System

12 Focal System

13 Receive Section

14 Control Box

26 Power-Source Mechanical Component

27 Power Source

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